Neuroreceptors are integral to the day-to-day work of psychiatrists. Their function and response to psychiatric medications play an important role in clinical work.

**Neurones and the synaptic cleft**

Neurones meet at a synapse where their axon terminals lie in close proximity to one another but do not touch. The space between is known as the synaptic cleft. In order for an action potential to move from one neurone to the next it must cross this synaptic cleft.

**Neurotransmitters are:**
- chemical messengers allowing an electrical impulse to be carried from one neurone to another
- chemical substances present in neurone endings
- released at the synapse of a neurone in response to a stimulus
- attached to specific receptors on another neurone to produce a specific effect
- degraded by special mechanisms.

**Types of neuroreceptors**

A neuroreceptor is a protein on the presynaptic or postsynaptic membrane of neurones with a recognition site and mechanisms to transmit impulses. The receptor type will determine if a neurotransmitter will either: stimulate a neurone causing depolarisation and creating an action potential (excitation) or stimulate a cell causing hyperpolarisation and inhibiting an action potential (inhibition).

Ionotropic receptors are ligand-gated ion channels that open rapidly and briefly to allow an electrical current to pass through the cell membrane.

Metabotropic receptors influence the activity of ion channels indirectly by or initiating a range of second messenger systems. They cause slow and prolonged modulation.

**Neurotransmitters and neuroreceptor subtypes**

GABA and glycine are inhibitory neurotransmitters, the rest are excitatory.

The four dopamine pathways are nigrostriatal, mesolimbic, mesocortical and tuberoinfundibular.

The locus coeruleus is the principal site for brain synthesis of noradrenaline. Dopamine is a precursor of noradrenaline and arises from cell bodies in the substantia nigra.

Serotonin is released from the raphe nucleus.

Acetylcholine arises from the nucleus basalis of Meynert.

**Further reading**

